PART I

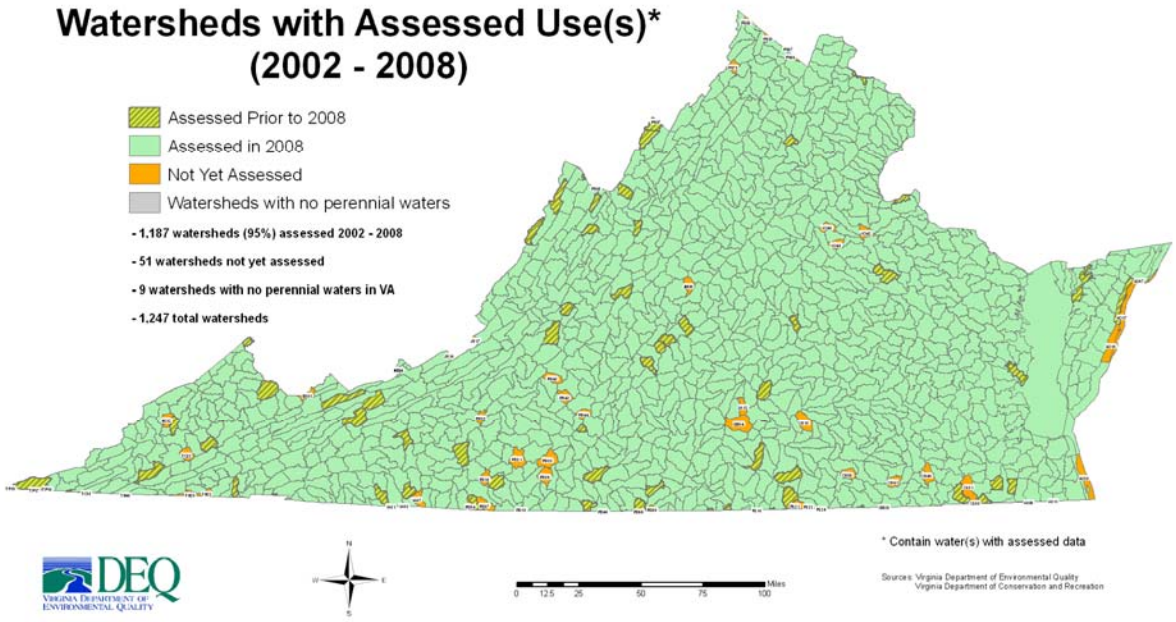
Chapter 1.1 EXECUTIVE SUMMARY

The 2008 Water Quality Assessment 305(b) and 303(d) Integrated Report (IR) describes the water quality conditions in the Commonwealth of Virginia during the time period January 1, 2001, through December 31, 2006. The primary purpose of this report is to satisfy the water quality reporting requirements of the Commonwealth of Virginia under Sections 305(b), 303(d), 106, 314 and 319 of the Federal Clean Water Act and the Virginia Water Quality Monitoring, Information and Restoration Act (Section 62.1-44.19:5 C of the Code of Virginia).

Overview of Results

Impaired area in rivers and streams increased from 9,002 miles in 2006 to 10,543 miles in 2008. Impaired area in estuaries decreased from 2,216 square miles in 2006 to 2,182 in 2008. Additionally, impaired area for significant lakes decreased from 109,208 acres in 2006 to 94,044 in 2008. This decrease was primarily due to the new assessment methodology for lake nutrient and dissolved oxygen (DO) Standards which became effective during 2007. As per established assessment guidance, impaired waters from previous assessments that do not have an approved TMDL, a rescinded shellfish condemnation, been confirmed as naturally impaired, or re-assessed according to appropriate/updated Standards continue to be counted as impaired in 2008 even if they were not monitored during the current reporting period. For the 2008 assessment, DEQ has used the 6th Order (12-digit) sub-watershed delineation scheme of the National Watershed Boundary Dataset (NWBD) which breaks down the former 494 watersheds into 1,247 smaller ones. At this scale 1,187 sub-watersheds have been assessed for at least one designated use between 2002 – 2008 using either water column and/or living resource data (Figure 1.1-1).

Figure 1.1-1 Map with sub-watersheds assessed since the 2002 report

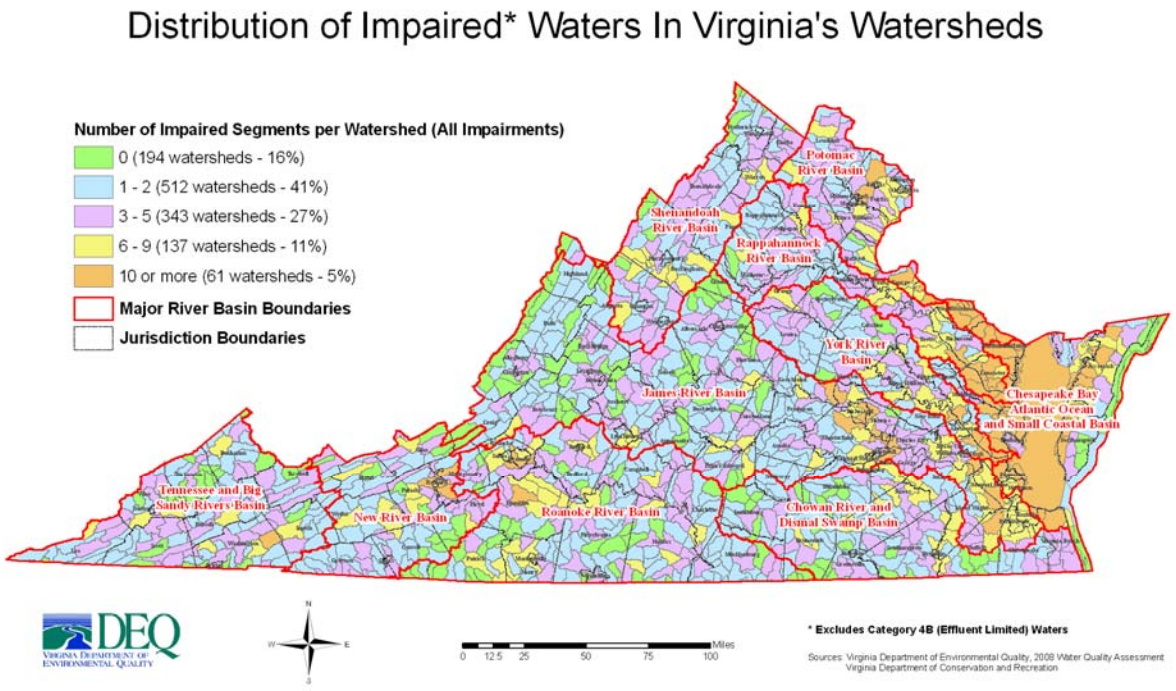


The Impaired Watershed Distribution Map (Figure 1.1-2) is a more accurate qualitative snapshot of the quality of surface waters in Virginia. Sub-watersheds that contain at least one impaired water are shown in Figure 1.1-2. Reporting more evenly-sized impaired sub-watersheds in this report will replace the reporting of impaired "segments" which varied too greatly in size to enable meaningful comparisons over a period of years.

0 impairments: 194 sub-watersheds, 16%
1 - 2 impairments: 512 sub-watersheds, 41%
3 - 5 impairments: 343 sub-watersheds, 27%
6 - 9 impairments: 137 sub-watersheds, 11%
≥10 impairments: 61 sub-watersheds, 5%

A history of impaired area by waterbody type is provided in Table 1.1-1. Additional details on each waterbody type are contained in Tables 1.1-2, 1.1-3, and 1.1-4.

Figure 1.1-2 Impaired Watersheds Distribution Map



This map can be downloaded at http://www.deq.virginia.gov/wqa

Assessment Method Used in This Report

Table 1.1-1 Impaired Area Identified Per Assessment Cycle By Waterbody Type 1996 - 2008

Waterbody Type	1996	1998	2002	2004	2006	2008
Rivers & Streams 51,016 (Miles)	2,016	2,611	4,838	6,931	9,002	10,543
Lakes 115,835 (Acres)	17,141	0	115,558 [1]	89,834	109,208	94,044
Estuaries 2,305 (Sq. Miles)	506	437	1,689	1,907	2,216	2,182

[1] Area included lakes shared by Virginia and North Carolina. Additional 25,724 acres determined to be in North Carolina and removed from Virginia's total impaired acreage.

DEQ initially incorporated the Integrated Reporting (IR) guidance and associated "Category" classification the U.S. Environmental Protection Agency (EPA) developed for the 2004 assessment. Like the 2004 and 2006 IR, the 2008 assessment combines the 305(b) overall assessment of Virginia's waters with those waters assessed as impaired but not needing a TMDL (Category 4) as well as impaired and needing a TMDL (Category 5) as per Section 303(d) of the Clean Water Act . Every water or "assessment unit" (AU) has been placed in the highest category applicable (i.e. 5 > 1) to any of the designated uses for which they were assessed. Below are the US EPA defined Categories:

- Category 1: Water fully supports all designated uses.
- Category 2: Water fully supports all designated uses data are available for, but there is either insufficient or no information regarding the remaining designated uses.
- Category 3: There is insufficient information to determine if any designated uses are being met.
- Category 4: Waters are impaired or threatened but do not need a TMDL.
- Category 5: Waters are impaired and do need a TMDL.

The EPA Integrated Report guidance allows the states to subdivide the federal Categories in order to address state programmatic needs. Virginia established subcategories for most EPA categories in 2004 and continues to refine subcategories, as needed, for 2008. See Chapter 2.2 of this report for a description of the Virginia defined subcategories and other information on the methodologies used for the assessment.

EPA defines threatened waters as those waters that are predicted to not meet Water Quality Standards during the next 305(b) reporting cycle and therefore considered needing a TMDL. DEQ believes impairment should be confirmed by current monitoring data that are compared to Water Quality Standards criteria prior to scheduling for TMDL development. DEQ uses trend analysis to determine which waters are threatened. For the 2008 assessment, the results of the first phase of probabilistic monitoring (ProbMon) for freshwater free-flowing wadeable streams have also been included. See Chapter 2.4 for additional details.

Virginia has used and continues to use the "observed effects" classification found in Virginia sub-categories 2B and 3C for waters that may indicate potential water quality problems. These assessments are primarily based on evaluated or other related data, especially those associated with nonpoint source impacts. See Chapter 2.2 for additional information on the assessment of waters with observed effects. As part of the ongoing assessment process, follow-up monitoring of these waters with observed effects, as resources allow, should provide more conclusive data for future assessments. Additional detail on impairment causes and sources can be found in Chapter 3.1 and overviews of the assessment in each river basin are detailed in Chapter 3.2.

Results – Rivers and Streams

This report presents the results of the assessment of water quality in approximately 15,951 miles (31.3%) of the total 51,016 miles of the state's free-flowing streams and rivers for which sufficient data was available to assess at least one or more designated uses. The remaining stream miles were evaluated as insufficient data to determine if designated uses are being met. Related information is presented based on sub-watersheds however, since sub-watersheds often have more than one waterbody, these numbers cannot be added together.

Table 1.1-2 presents the results of the 2008 assessment for the river and stream miles assessed.

Table 1.1-2 Assessment Results for Rivers/Streams

Degree of Use Support	Water Type	Total Miles *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Uses (EPA Categories 1 and 2)	River (mi.)	5,408	639
Insufficient Data (EPA Category 3)	River (mi.)	35,033	1,118
Impaired (EPA Categories 4 and 5)	River (mi.)	10,543	932
Total	River (mi.)	51,016	N/A

The leading cause of impairment of designated uses in Virginia's rivers and streams is violation of the E. coli bacteria Standards (5,981 mi). In 2003, Virginia adopted three bacteria criteria for primary recreation (swimming) use including fecal coliform, E. coli and enterococci. See 9 VAC 25-260-170 for additional information on these criteria. For 2008, DEQ has used E. coli (in freshwater) and enterococci (in estuaries) as the recreational use bacteria indicator, replacing fecal coliform criteria. However, previous fecal coliform impairments have been carried forward if no data has been collected for the new indicators. Agricultural practices appear to be one of the primary sources contributing to the bacteria Standards violations. However, urban runoff, leaking sanitary sewers, urban storm sewers, failing septic tanks, domestic animals and even wildlife can also be significant contributing sources.

Results – Lakes and Reservoirs

Per the 2008 assessment guidance, lakes and reservoirs that are regulated under 9 VAC 26-260-187 (§187-Lake/Reservoir Nutrient Standards) are publicly accessible and greater than 100 acres, or serve as a public water supply are considered significant and a priority for monitoring and assessment. Other non-significant lakes may have also been monitored and assessed for special studies or other assessment needs and the results are included in the total sizes listed in Table 1.1-3. For 2008, Virginia assessed 109 of the 122 significant lakes/reservoirs found in Appendix C of this report. For the reporting period, a total of 112,310 acres (97%) were monitored in Virginia and assessed with sufficient data for one or more designated uses. The remaining acres were evaluated as insufficient to assess any designated uses.

Table 1.1-3 presents the results from the 2008 assessment of lakes and reservoirs.

Table 1.1-3 Assessment Results for Lakes/Reservoirs

Degree of Use Support	Water Type (110 monitored)	Total Acres *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Uses (EPA Categories 1 and 2)	Lakes (acres)	18,266	80
Insufficient Data (EPA Category 3)	Lakes (acres)	3,526	18
Impaired (EPA Categories 4 and 5)	Lakes (acres)	94,044	112
Total	Lakes (acres)	115,835	N/A

Many reservoirs were previously impaired for aquatic life use, primarily due to natural stratification causing dissolved oxygen (DO) depletion in the hypolimnion (bottom waters). However, nutrient Standards, adopted in 2007 for §187 lakes and reservoirs, limit DO assessment to the epilimnion (top layer above stratification) during the warmer months of each year. This has eliminated many natural DO impairments due to stratification in the hypolimnion (bottom waters) from assessment Category 4 and resulted in many reservoirs being delisted for DO in 2008. Exceedence of the fish tissue standard for PCB (Polychlorinated Biphenyls) remain a major cause of fish consumption use impairment in lakes and reservoirs.

Results – Tidal Estuaries

Chesapeake Bay Water Quality Standards adopted in 2005, and refined in 2006 and 2007, were assessed in the 2008 report. Additional details and assessment information related to the Chesapeake Bay can be found in Chapter 6.7. Additional refinements to Chesapeake Bay criteria assessments will be incorporated by all Bay partners in 2010.

Table 1.1-4 presents the assessment category results from the 2008 assessment of tidal estuaries. Sufficient data was available for assessment of one or more designated uses in essentially all of the 2,305 square miles of estuarine waters.

Table 1.1-4 Assessment Results for Estuarine Waters

Degree of Use Support	Water Type	Total Square Miles *(Rounded to the Nearest Whole Number)*	No. of Sub-watersheds Affected
Supports Designated Uses (EPA Categories 1 and 2)	Estuary (sq. mi.)	123	41
Insufficient Data (EPA Category 3)	Estuary (sq. mi.)	0	4
Impaired (EPA Categories 4 and 5)	Estuary (sq. mi.)	2,182	191
Total	Estuary (sq. mi.)	2,305	N/A

A leading cause of impairment in Virginia's estuarine waters is failure to meet the Shallow Water Use goals (primarily submerged aquatic vegetation), adopted in 2005, which is associated with the overall aquatic life use. Dissolved oxygen violations during the summer months are also widespread in estuarine waters (Chapter 6.7). Another major cause of impairment is violation of the fecal coliform bacteria Standard associated with shellfish consumption advisories. Shellfish use is determined by fecal coliform bacteria, rather than E.coli or enterococci bacteria indicators which are used for recreation use assessment.

Based on limited available information, all of Virginia's 120 miles of the Atlantic Ocean Coastal Waters were evaluated as fully supporting Virginia's designated uses.

Fish Consumption Advisories

As of December 31, 2007, there were 54 fish consumption advisories in Virginia, 39 for PCBs, 20 for Mercury, and one for Kepone. Five advisories are for both PCBs and Mercury and three others have overlapping PCBs and Mercury segments and one for Kepone and PCBs. The fish consumption advisories due to mercury are attributable to DEQ fish tissue monitoring in certain waterbodies that have environmental conditions which have been associated with increased potential for bioaccumulation of mercury in fish. These environmental conditions include low pH, low DO and high organic matter. Many of these waterbodies are swamp waters (Class VII) and have little or no industrial or municipal dischargers and have not been sampled before. The Virginia Department of Health issues fish consumption advisories. Additional information can be found in Chapter 6.5.